Tests & Quizzes

Exam 1

Return to Assessment List

Part 1 of 6 - 20.0/ 20.0 Points

Let $A = \{ a, b, c, \{a, b\}, \{b, c\}, \{a, b, c\} \}$

For each of the following, determine if it is True or False:

Question 1 of 4

5.0/ 5.0 Points

$\{a, c\} \in A$

✔ ○ True
● False

Answer Key: False

Question 2 of 4

5.0/ 5.0 Points

$\{a, c\} \subseteq A$

✔ ● True
○ False

Answer Key: True

Question 3 of 4

5.0/ 5.0 Points

$\{ \} \in A$

✔ ○ A. True

B. False

Answer Key: False

Question 4 of 4

5.0/ 5.0 Points

$\{\} \subseteq A$

✔ A. True

B. False

Answer Key: True

Part 2 of 6 -

10.0/ 10.0 Points

Make the following conversions:

Question 1 of 2

5.0/ 5.0 Points

Convert the decimal number $(-100)_{10}$ to its 8-bits two's complement representation

$(-100)_{10}$ = (✔10011100)$_{8\text{-bit 2's complement}}$

Answer Key: 10011100

Question 2 of 2

5.0/ 5.0 Points

Convert the hexa-decimal number $(ab)_{16}$ to its base-5 representation

$(ab)_{16}$ = (✔1141)$_5$

Answer Key: 1141

Part 3 of 6 -

12.0/ 12.0 Points

Question 1 of 2

6.0/ 6.0 Points

Let f be a function that maps positive integers to positive integers.

f is defined as follows: $f = \begin{cases} 3k+1 & \text{if } k \text{ is even} \\ 2k-1 & \text{if } k \text{ is odd} \end{cases}$

Determine if the statement: "f is a one-to-one function" is True or False, and explain your answer.

✔ ○ True
◉ False

Rationale:
4 and 7 both map to 13, violating the definition of a one-to-one function (if x1 != x2, then f(x1) must not equal f(x2).)

Answer Key: False

Question 2 of 2

6.0/ 6.0 Points

Give an example of a function from the set of positive integers: {1, 2, 3, 4, ...}, to the set of non-negative integers: {0, 1, 2, 3, 4, ...}. Your function **has to be onto, but not one-to-one**.

If you wish to format your answer, press the "Show Rich-Text Editor" link

For x<=2: f(x) = x-1
For x>2: f(x) = x-2

Part 4 of 6 -

13.0/ 13.0 Points

Question 1 of 2

7.0/ 7.0 Points

How many strings of length 10, with letters taken from {A, B, C, D, E}, contain at least 1 A? Explain your answer.

We should find the total number of possible permutations if no restrictions are placed, 5^10, and subtract the number of permutations where A is not selected at all, 4^10.

So the total answer is 5^10-4^10.

Question 2 of 2

6.0/ 6.0 Points

How many strings of length 10, with letters taken from {A, B, C, D, E}, contain at least 1 A and at least 1 B? Explain your answer.

We need to find the sum of number of permutations when at least one A is selected and that of when at least one B is selected, and then subtract out the duplicates to avoid double counting.

It should be the previous answer * 2 - when both A and B are selected.

Number of permutations when both A and B are selected is total possible number minus the number when neither of them is selected (meaning when we now only have 3 instead of 5 choices), 5^10-3^10.

So the final answer is 2*(5^10-4^10) - (5^10-3^10).

Comment: could simplify this but ok

Part 5 of 6 - 15.0/ 15.0 Points

Question 1 of 1

15.0/ 15.0 Points

Write a program that reads a positive integer n, and prints a nXn square, where its lines are filled with '*' and '#' symbols alternating (first line is filled with '*', second line is filled with '#', third line is filled with '*', etc.).

Your program should interact with the user **exactly** as demonstrated bellow, where the text shown in blue is what the program should print, and the text in black could be a user's response:

```
Please enter a positive integer:
5
*****
#####
*****
#####
*****
```

Notes:
1. You may use Xcode or Visual Studio to solve this question. You should create an empty project, and work only in it. You are not allowed to look at old projects.
2. **For submission, download the file below. Paste your code in it, and upload it back.**

part 5.txt 0 KB

part 5.txt (0.56 KB)

Part 6 of 6 - 30.0/ 30.0 Points

Question 1 of 1

30.0/ 30.0 Points

Write a program that reads from the user some sequences, each containing positive integers. Your program should tell how many of these sequences had even number of elements and how many had odd number of elements.

Implementation requirement: The user should first enter the number of sequences, then type each sequence in a separate line, separating the elements by a space, and typing -1 (at the end of the line) to indicate the end of that sequence.

Note: The (-1) doesn't count as an element of a sequence.

Your program should interact with the user **exactly** as demonstrated bellow, where the text shown in blue is what the program should print, and the text in black could be a user's response:

How many sequences do you wish to enter?
5
Please enter 5 lines, each with a sequence of positive integers. For each sequence, separate the elements by a space, and end it by typing -1:
Sequence #1: 3 13 -1
Sequence #2: 4 4 7 5 3 -1
Sequence #3: 2 -1
Sequence #4: 54 66 9 -1
Sequence #5: 8 18 -1
There were 2 with even number of elements, and 3 with odd number of elements

Notes:
1. You may use Xcode or Visual Studio to solve this question. You should create an empty project, and work only in it. You are not allowed to look at old projects.
2. **For submission, download the file below. Paste your code in it, and upload it back.**

part 6.txt 0 KB

part 6.txt (0.94 KB)

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